

comprises a plurality of top level bits, wherein each top level bit corresponds to a group of intermediate level bits, and wherein each top level bit is set if its corresponding group of intermediate level bits has at least one bit set and is cleared if no bits are set in its corresponding group of intermediate level bits.

37. (Original) The system as recited in claim 31, wherein said first memory and said second memory are part of a memory block accessible by said host adapter.

38. (Original) The system as recited in claim 31, wherein said second memory is a register comprised within an integrated circuit with said host adapter.

REMARKS

Claims 3, 4, 6, 12, 14, 18, 20, 27, 28 and 30 have been amended. Claims 1-38 remain pending in the application. Reconsideration is respectfully requested in light of the following remarks.

Objection to the Drawings:

The objection to the drawings is overcome by the amendments to the drawings made herewith.

Section 112, Second Paragraph, Rejection:

The Office Action rejected claims 6 and 28 under 35 U.S.C. § 112, second paragraph, as indefinite. In light of the amendments to claims 6 and 28, Applicant submits that this rejection has now been overcome. In regard to claim 28, Applicant notes that the terms “service unit” and “maximum message size” are not limited to any particular type of measurement. For example, a maximum message size could be specified in time, data quantity, or any other suitable measurement.

Section 102(b) Rejection:

The Office Action rejected claims 1, 9-23 and 25-36 under 35 U.S.C. § 102(b) as being anticipated by Christensen et al. (U.S. Patent 4,271,468) (hereinafter "Christensen"). As set forth in more detail below, Applicant respectfully traverses this rejection.

Christensen does not teach a first memory configured to store a lowest level of a hierarchical channel map, wherein the lowest level comprises one bit for each communication channel supported by the host adapter, wherein each bit of the lowest level is set to indicate that the communication channel to which it is mapped has a pending communication request and is cleared if the communication channel to which it is mapped does not have a pending communication request, as recited in claim 1. The Examiner equates Christensen's queues Q0-Q7 stored in main storage 23 to the lowest level of the hierarchical channel map recited in Applicant's claim 1. Applicant's claim 1 recites that the lowest level of the hierarchical channel comprises one bit for each communication channel supported by the host adapter and that each bit is mapped to one of the communication channels to indicate whether or not the communication channel to which it is mapped has a pending request. In contrast, Christensen's queues Q0-Q7 store interrupt requests. There is no teaching in Christensen that queues Q0-Q7 comprises one bit for each communication channel supported by the host adapter. As taught in Christensen, each queue entry stores a channel interrupt request until the request is removed from the queue by one of the central processors (col. 7, lines 20-27). Whether or not a particular queue or queue entry contains an interrupt request has absolutely no bearing on whether or not a request is pending for a particular channel. For example, in Christensen, once an interrupt request has been remove from a queue, the same I/O channel may or may not have another interrupt request pending in a different queue entry or even a different queue. Furthermore, in Christensen, once an interrupt request has been remove from a queue, the same queue entry can be used to store an interrupt request from a completely different I/O channel. Christensen's queues

Q0-Q7 clearly do not store a lowest level of a hierarchical channel map comprising one bit for each communication channel supported by the host adapter wherein each bit of the lowest level indicates whether or not the communication channel to which it is mapped has a pending communication request, as recited in claim 1.

Furthermore, Christensen does not teach a host adapter that is configured to determine a next channel to be serviced by examining the hierarchical channel map, as recited in claim 1. The Examiner equates Christensen's channel controller 24 with the host adapter of Applicant's claim 1. However, Christensen's channel controller 24 does not examine a hierarchical channel map to determine a next channel to be serviced. Christensen teaches that interrupt requests are added to the queues by channel controller 24 and removed by central processors 20, 21 (which the Examiner equates to the communication targets of claim 1). This is not an examination of a hierarchical channel map to determine a next channel to be serviced. The Examiner equates PND register 46 to the top level of Applicant's hierarchical channel map. However, Christensen's channel controller 24 does not examine pending (PND) register 46 to determine a next channel to be serviced. Also, contrary to the Examiner's assertion, the order in which interrupt requests are placed on the queues does not determine the order in which they are serviced. Instead, Christensen teaches that the state of PND register 46 is continuously broadcast to central processors 20, 21 (col. 6, lines 60-62). The central processors select a queue corresponding to one of the states broadcast by the system controller 22. A central processor indicates an accepted queue to the system controller 22 (col. 6, line 62 - col. 7, line 5). For a particular queue, the system controller 22 then selects one of the processors that has accepted that queue to handle the queue (col. 7, lines 30-59). Thus, no component in Christensen's system ever examines queues Q0-Q7 to determine a next channel to be serviced. Instead, Christensen's system controller 22 selects a particular processor to handle each queue by the method described above.

Applicant reminds the Examiner that anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim. *Lindemann Maschinenfabrik GmbH v. American Hoist &*

Derrick Co., 221 USPQ 481, 485 (Fed. Cir. 1984). The identical invention must be shown in as complete detail as is contained in the claims. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). For the reasons set forth above, claim 1 is clearly not anticipated by Christensen. Similar arguments apply in regard to independent claim 18.

In regard to independent claim 12, Christensen does not teach selecting a set bit in a top level of a hierarchical channel map, wherein the set bit in the top level indicates a group of bits in a next level of the hierarchical channel map to examine. As discussed above, a central processor 20, 21 in Christensen does select from among active states of PND register 46 as broadcast by system controller 22 in order to accept a queue to handle. However, the PND register position selected by the central processor only indicates a particular queue that the processor has accepted for handling. If the processor is selected by system controller 22, the processor then removes the oldest active entry on the accepted queue (col. 7, lines 20-24). The selection of a PND register position by a central processor in Christensen clearly does not indicate a group of bits in a next level of a hierarchical channel map to examine. Therefore, claim 12 is clearly not anticipated by Christensen.

Further in regard to claim 12, Christensen does not teach examining in each of one or more intermediate levels of the hierarchical channel map only a group of bits indicated by the set bit selected in the previous level and selecting a set bit from each examined group, wherein the top level is the previous level for a first intermediate level. Christensen does not teach any intermediate level or levels of a hierarchical channel map. The Examiner did not provide any explanation of how this element of claim 12 is taught by Christensen.

Further in regard to claim 12, Christensen does not teach examining in a lowest level of the hierarchical bit map only a group of bits indicated by the previous intermediate level and selecting a set bit from the examined group of the lowest level, wherein the selected bit at the lowest level indicates one of the plurality

of communication channels to be serviced, and servicing a communication request from the communication channel indicated by the selected bit from the lowest level of the hierarchical channel map. Instead, in Christensen a processor that has accepted a queue is selected by the system controller and that processor removes the oldest active entry on the accepted queue.

In regard to independent claim 29, Christensen does not teach a computer readable medium comprising program instructions operable to perform as indicated in claim 29. Most of the functionality described in Christensen is performed by hardware circuits as illustrated in Figs. 2A, 2B, 3A, 3B. Christensen refers to interrupt handlings circuits at col. 8, line 32, and interrupt acceptance determination circuits at col. 8, line 59. Christensen does not teach a computer readable medium comprising program instructions that operate as recited in claim 29. Therefore, claim 29 is not anticipated by Christensen.

Further in regard to claim 29, Christensen does not teach a top level service mask, a second level service mask and a bottom level service mask and the corresponding operations as recited in claim 29. On pp. 4-5 of the Office Action, the Examiner only refers to Christensen's I/O mask 51. Applicant does not see any relevance to Christensen's I/O mask 51 to the top level, second level and bottom level service masks recited in claim 29. Christensen's I/O mask 51 is described only as preventing the processor from accepting a particular queue for handling as indicated by the PND register states broadcast by system controller 22 (col. 6, lines 56-59; Fig. 3A). Furthermore, Christensen's I/O mask 51 does not indicate a position in a level group of a hierarchical channel map. Nor is it set to indicate a selected first set bit in the current level group. Nor does Christensen teach top level, second level and bottom level groups of a hierarchical channel map as recited in claim 29.

In regard to independent claim 30, Christensen does not teach, for a first service time, examining a portion of one or more intermediate levels of the hierarchical channel map to select a lowest level group of the communication

channels in which at least one channel has a pending communication request, wherein each intermediate level indicates for each of a plurality of groups of the communication channels if at least one channel of that group has a pending communication request, wherein the groups at each intermediate level are sized smaller than at the previous intermediate level, and wherein examining a portion of each intermediate level determines which portion of the next hierarchical channel map level to examine. Applicant can find no teaching in Christensen that corresponds to this portion of claim 30. Nor has the Examiner explained how this portion of claim 30 is taught by Christensen. The Examiner only attempted to correspond teachings in Christensen to elements of claim 1. However, claim 30 differs from claim 1 and the Examiner did not provide any explanation of how the particular features of claim 30 are anticipated by Christensen. Therefore, the rejection of claim 30 is improper. Applicant asserts that claim 30 is not anticipated by Christensen.

In regard to independent claim 31, Christensen does not teach a second memory configured to store a top level of a hierarchical channel map, wherein the plurality of communication channels are organized in channel sections, and wherein for each channel section said top level indicates if at least one of the communication channels within that section has a pending communication request. The PND register in Christensen indicates which queues have pending interrupt requests. However, this does not serve to organize the communication channels in Christensen into channel sections as recited in claim 31.

Further in regard to claim 31, Christensen does not teach a host adapter configured to determine a next channel to service by examining the lowest level in the first memory, wherein the host adapter determines the next channel to service by examining no more of the lowest level than a portion of the lowest level corresponding to one of the channel sections indicated by the top level as having at least one pending communication request. As discussed above, nothing in Christensen examines queues Q0-Q7 to determine a next channel to service. Christensen clearly does not teach examining no more of a lowest level of a hierarchical channel map than a

portion of the lowest level corresponding to one of the channel sections indicated by the top level as having at least one pending communication request.

Section 103(a) Rejection:

The Office Action rejected claims 7, 8, 24, 37 and 38 under 35 U.S.C. § 103(a) as being unpatentable over Christensen. Applicant asserts that pending claims 7, 8, 24, 37 and 38 are patentable over the cited art for at least the reasons given above in regard to their respective independent claims.

In regard to both the section 102 and section 103 rejections, Applicant also asserts that numerous ones of the dependent claims recited further distinctions over the cited art. However, since the independent claims have been shown to be patentably distinct, a further discussion of the dependent claims is not necessary at this time.

Allowable Subject Matter:

Claims 2-5 were rejected to as being dependent upon a rejected base claim but otherwise allowable if rewritten in independent form. Claim 6 was rejected under 35 U.S.C. § 112, second paragraph, but was deemed allowable if rewritten to overcome the rejection. In light of the above remarks, Applicant asserts that claims 2-6 are allowable in their present form as depending from patentable distinct base claims.

CONCLUSION

Applicant submits the application is in condition for allowance, and notice to that effect is respectfully requested.

If any extension of time (under 37 C.F.R. § 1.136) is necessary to prevent the above referenced application from becoming abandoned, Applicant hereby petitions for

such extension. If any fees are due, the Commissioner is authorized to charge said fees to Meyertons, Hood, Kivlin, Kowert, & Goetzel, P.C. Deposit Account No. 501505/5181-36000/RCK.

Also enclosed herewith are the following items:

- ☒ Return Receipt Postcard
- ☐ Petition for Extension of Time
- ☒ Replacement Drawing Sheets (Figs. 1 & 2)
- ☐ Notice of Change of Address
- ☐ Fee Authorization Form authorizing a deposit account debit in the amount of \$
for fees ().
- ☐ Other:

Respectfully submitted,



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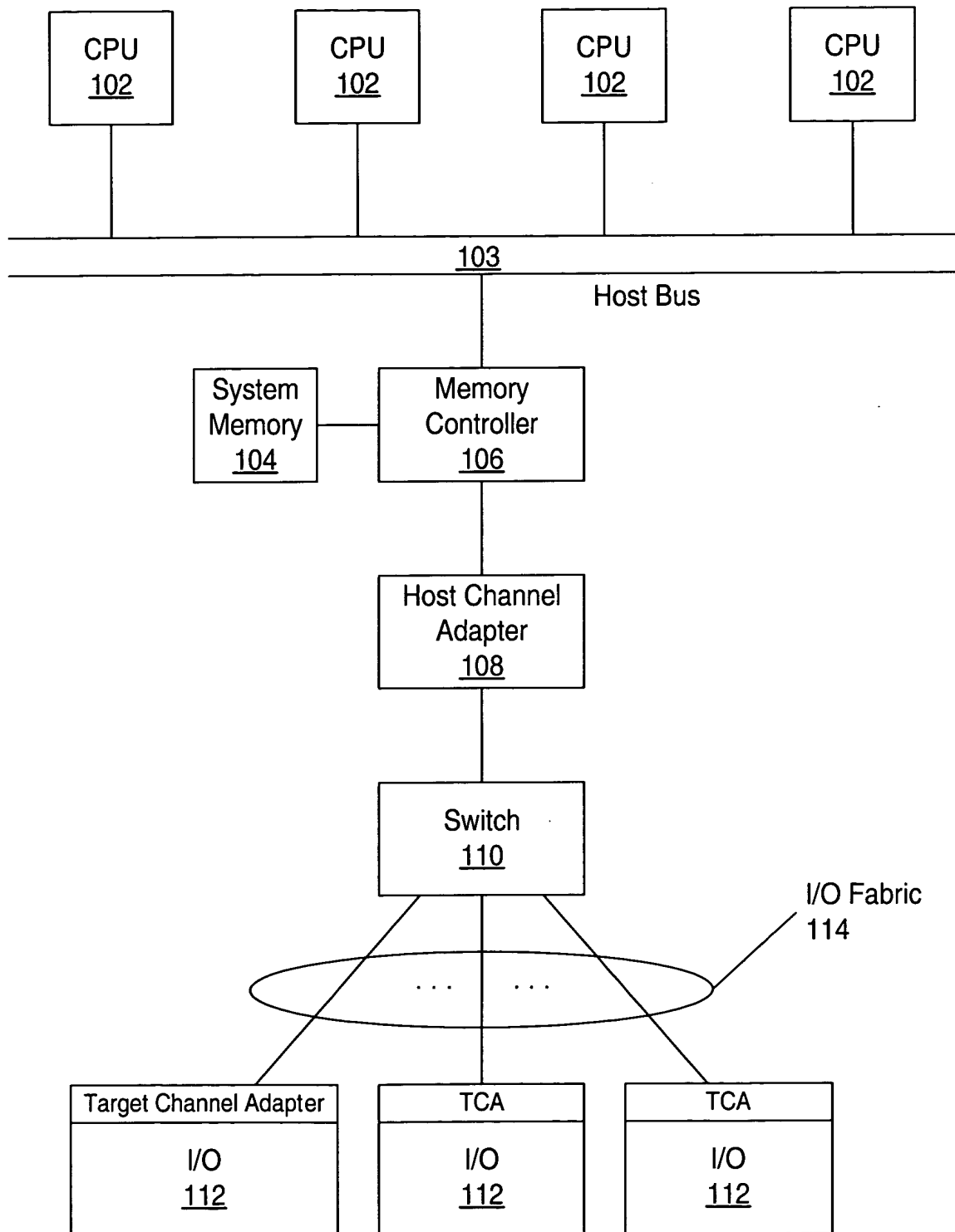


FIG. 1
(Prior Art)

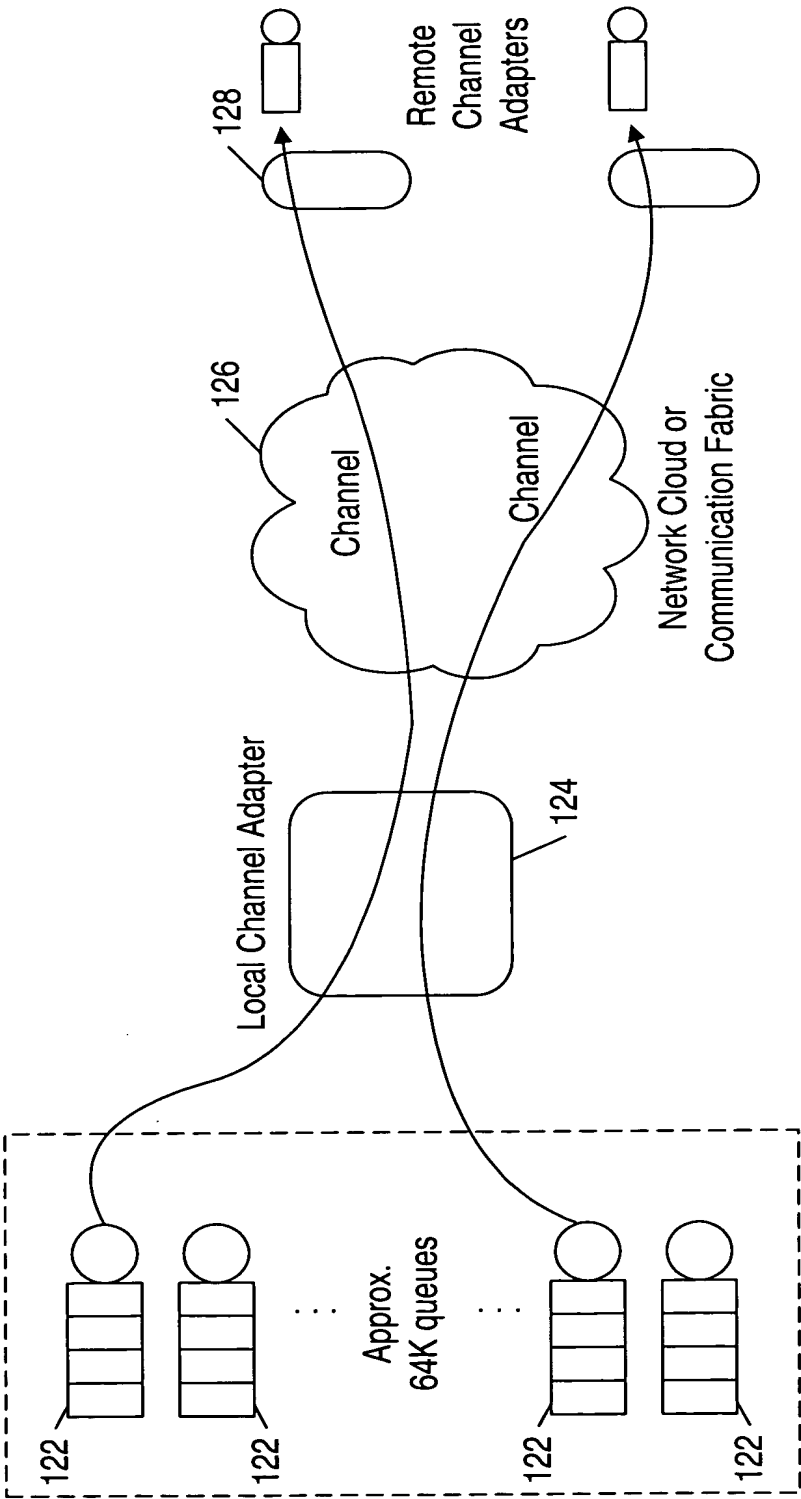


FIG. 2
(Prior Art)